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Claims

[c1] We claim:

1.An airfoil, comprising:

a first plurality of cooling holes positioned within the airfoil;

said first plurality of cooling holes comprising a turbulated section and an non-turbulated section; and

a second plurality of cooling holes positioned within the airfoil;

said second plurality of cooling holes comprising a turbulated section and a non-turbulated section.

[c2] 2.The airfoil of claim 1, wherein said first plurality of cooling holes comprises five (5) cooling holes.

[c3] 3.The airfoil of claim 1, wherein said first plurality of cooling holes comprises a first end and a second end and wherein said turbulated section extends from about thirty-five percent (35%) of the length of said first plurality of cooling holes from said first end to about seventy-five percent (75%) of the length of said first plurality of cooling holes from said first end.

[c4] 4.The airfoil of claim 1, wherein said turbulated section

of said first plurality of cooling holes comprises a first diameter, wherein said non-turbulated section of said first plurality of cooling holes comprises a second diameter, and wherein said first diameter is larger than said second diameter.

[c5] 5.The airfoil of claim 4, wherein said turbulated section may have a diameter of about 0.175 inches (about 4.45 millimeters) and said non-turbulated section may have a diameter of about 0.135 inches (about 3.43 millimeters).

[c6] 6.The airfoil of claim 1, wherein said turbulated section of said first plurality of cooling holes comprises ribs therein.

[c7] 7.The airfoil of claim 1, wherein said non-turbulated section of said first plurality of cooling holes comprises a plurality of non-turbulated sections.

[c8] 8.The airfoil of claim 1, wherein said second plurality of cooling holes comprises two (2) cooling holes.

[c9] 9.The airfoil of claim 1, wherein said second plurality of cooling holes comprises a first end and a second end and wherein said turbulated section extends from about fifty percent (50%) of the length of said second plurality of cooling holes from said first end to about seventy-five percent (75%) of the length of said second plurality of

cooling holes from said first end.

[c10] 10.The airfoil of claim 1, wherein said turbulated section of said second plurality of cooling holes comprises a first diameter, wherein said non-turbulated section of said second plurality of cooling holes comprises a second diameter, and wherein said first diameter is larger than said second diameter.

[c11] 11.The airfoil of claim 10, wherein said turbulated section may have a diameter of about 0.165 inches (about 4.19 millimeters) and said non-turbulated section may have a diameter of about 0.125 inches (about 3.18 millimeters).

[c12] 12.The airfoil of claim 1, wherein said non-turbulated section of said second plurality of cooling holes comprises a plurality of non-turbulated sections.

[c13] 13.The airfoil of claim 1, further comprising a third plurality of cooling holes positioned within the airfoil, said third plurality comprising a non-turbulated section.

[c14] 14.The airfoil of claim 13, wherein said non-turbulated section comprises a diameter of about 0.115 inches (about 2.92 millimeters).

[c15] 15.The airfoil of claim 13, wherein said first plurality of

cooling holes, said second plurality of cooling holes, and said third plurality of cooling holes comprise nine (9) cooling holes.

[c16] 16.The airfoil of claim 15, further comprising a tenth cooling hole positioned therein.

[c17] 17.The airfoil of claim 16, wherein said tenth cooling hole comprises a diameter of about 0.08 inches (about 2.03 millimeters).

[c18] 18.An airfoil for use with a turbine, comprising:
a first end;
a middle portion;
a second end; and
a plurality of cooling holes extending through said first end, said middle portion, and said second end;
said plurality of cooling holes positioned in said first end according to the Cartesian coordinate values set forth in Table I; and
said plurality of cooling holes positioned in said middle portion according to the Cartesian coordinate values set forth in Table III.

[c19] 19.The airfoil of claim 18, wherein said plurality of cooling holes positioned in said second end according to the Cartesian coordinate values set forth in Table II.

[c20] 20.The airfoil of claim 18, wherein said airfoil comprises a second stage airfoil.